Softstarters – overview

Type PSR - the compact range

Softstarter, Type	PSR3	PSR6	PSR9	PSR12	PSR16	PSR25	PSR30	PSR37	PSR45
Normal start, In Line connected :									
(480 V), **hp**	2	3	5	7.5	10	15	20	25	30
UL, Max. A	3.4	6.1	9	11	15.2	24.2	28	34	46.2
(400 V), **kW**	1.5	3	4	5.5	7.5	11	15	18.5	22
IEC, Max. A	3.9	6.8	9	12	16	25	30	37	45
480V, 104 °F									
Manual Motor Starter, Type									
If using manual motor starter or an MCCB Type 1 coordination will be achieved.	MS116	MS116	MS116	MS116	MS116	MS325	MS450	MS450	MS450
Fuse protection 480 V, J Fuse based on UL, max A x 1.75									
Using J fuses, Type 1 coordination will be achieved. To achieve Type 2 coordination for the PSS or PST(B) softstarters semi-conductor fuses must be used.	10 A	10 A	20 A	20 A	30 A	40 A	50 A	60 A	80 A
Fused disconnect									
Suitable fused disconnect for the recommended J fuses.	OS30	OS30	OS30	OS30	OS30	OS60	OS60	OS60	OS100
Short circuit current rating	10 A 5kA	10 A 5kA	20 A 5kA	20 A 5kA	30 A 5kA	40 A 5kA	50 A 5kA	60 A 5kA	80 A 5kA
AC3 rated By-pass contactor, Type									
The line contactor is not required for the softstarter itself but often used to open if OL trips.	A9	A9	A9	A12	A16	A26	A30	A40	A40
Thermal overload relay, Type									
The overload relay is always required to protect the motor.	TA25DU	TA25DU	TA25DU	TA25DU	TA25DU	TA25DU	TA25DU	TA42DU	TA75DU
AC1 rated By-pass contactor, Type									
The by-pass contactor can be used to reduce the power loss of the softstarter but also to increase the number of starts/h.	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in
Current transformers									
The current transformer is required if the current limit function of the PSS is used.	-	-	-	-	-	-	-	-	-

Type PSS - the flexible range

	PSS18/30 ... 44/76				PSS50/85 ... 72/124			PSS85/147 ... 142/245			PSS175/3000/515		
	PSS 18/30	PSS 30/52	PSS 37/64	PSS 44/76	PSS 50/85	PSS 60/105	PSS 72/124	PSS 85/147	PSS 105/181	PSS 142/245	PSS 175/300	PSS 250/430	PSS 300/515
(480 V), **hp**	10	20	25	30	30	40	50	60	75	100	125	150	200
UL, Max. A	18	28	34	40	47	56	67	85	105	125	156	225	248
(400 V), **kW**	7.5	15	18.5	22	25	30	37	45	55	75	90	132	160
IEC, Max. A	18	30	37	44	50	60	72	85	105	142	175	250	300
480V, 104 °F													
MCCB Branch protection, Type													
	T2	T2	T2	T2	T2	T2	T2	T3	T3	T3	T4	T4	T5
Fuse protection 65 kA (Max. fuse size), Semiconductor fuses, Bussman with fuse holder, Type													
	170M1364 170H1007	170M1366 170H1007	170M1368 170H1007	170M1369 170H1007	170M1369 170H1007	170M1370 170H1007	170M1371 170H1007	170M1372 170H1007	170M3019 170H3004	170M3020 170H3004	170M3021 170H3004	170M5013 170H3004	170M5015 170H3004
Fused disconnect													
	OS60 35A 5kA	OS60 45A 5kA	OS60 60A 5kA	OS60 80A 5kA	OS100 80A 5kA	OS100 100A 5kA	OS200 125A 10kA	OS200 150A 10kA	OS400 200A 10kA	OS400 250A 10kA	OS400 300A 10kA	OS400 400A 10kA	OES600 500A 18kA
AC3 rated By-Pass, Type													
	A16	A26	A30	A40	A40	A50	A63	A95	A110	A145	A185	A210	A260
Thermal overload relay, Type													
	TA25DU	TA25DU	TA42DU	TA75DU	TA75DU	TA75DU	TA75DU	TA110DU	TA110DU	TA200DU	TA200DU	TA450DU	TA450DU
AC1 rated By-Pass, Type													
	A9	A16	A26	A26	A30	A40	A50	A50	A75	A110	A145	A145	A185
Current transformers, Type													
	PSCT-60 2 turns	PSCT-40 1 turn	PSCT-50 1 turn	PSCT-60 1 turn	PSCT-75 1 turn	PSCT-75 1 turn	PSCT-100 1 turn	PSCT-125 1 turn	PSCT-150 1 turn	PSCT-200 1 turn	PSCT-250 1 turn	PSCT-400 1 turn	PSCT-400 1 turn

Type PST/PSTB - the advanced range

	PST30 ... 72					PST85 ... 142			PST175 ... 300					PSTB370 ... 470		PSTB570 ... 1050			
	PST 30	PST 37	PST 44	PST 50	PST 72	PST 85	PST 105	PST 142	PST 175	PST 210	PST 250	PST 300		PSTB 370	PSTB 470	PSTB 570	PSTB 720	PSTB 840	PSTB 1050
	20 28	25 34	30 42	40 54	50 68	60 80	75 104	100 130	125 156	150 192	200 248	250 302		300 361	400 480	500 590	600 720	700 840	900 1062
	15 30	18.5 37	22 44	25 50	37 72	45 85	55 105	75 142	90 175	110 210	132 250	160 300		200 370	250 470	315 570	400 720	450 840	560 1050
480V, 104 °F																			
MCCB Branch Protection, Type																			
	T2	T2	T2	T2	T2	T3	T3	T3	T4	T4	T5	T5		T5	T5	S6	S6	S7	S7
Fuse protection 65 kA (Max. fuse size), Semiconductor fuses, Bussman with fuse holder, Type																			
	170M1366 170H1007	170M1368 170H1007	170M1369 170H1007	170M1369 170H1007	170M1371 170H1007	170M1372 170H1007	170M3019 170H3004	170M3020 170H3004	170M3021 170H3004	170M5012 170H3004	170M5013 170H3004	170M5015 170H3004		170M5013 170H3004	170M5015 170H3004	170M5015 170H3004	170M5018 170H3004	170M6018 170H3004	170M6020 170H3004
Fused disconnect																			
	OS60 45A 5kA	OS60 60A 5kA	OS100 80A 5kA	OS100 100A 5kA	OS200 125A 10kA	OS200 150A 10kA	OS400 200A 10kA	OS400 250A 10kA	OS400 300A 10kA	OS400 400A 10kA	OES600 400A 18kA	OES600 500A 18kA		OES600 600A 18kA	OES800 800A 30kA	– L900A 30kA	– L1200A 42kA	– ① 42kA	– ① 85kA
AC3 rated By-pass contactor, Type																			
	A26	A30	A40	A50	A63	A75	A110	A145	A185	A210	A260	A300		AF400	AF460	AF580	AF750	AF1350	AF1650
Electronic overload relay																			
	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in		Built-in	Built-in	Built-in	Built-in	Built-in	Built-in
AC1 rated By-pass contactor, Type																			
	A16	A26	A30	A40	A50	A50	A75	A110	A145	A145	A185	A260		Built-in AF260	Built-in AF300	Built-in AF400	Built-in AF580	Built-in AF750	Built-in AF750
Current transformers																			
	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated		Integrated	Integrated	Integrated	Integrated	Integrated	Integrated

① PSTB840 and PSTB1050: Fused disconnect not available, use fuse holder, Bussman type, 170H3004.

PSR

LED indications:
On/Ready
Run/Top of ramp
Three rotating switches setting:
-Start ramp (1–10 sec)
-Stop ramp (0–20 sec)
-Initial voltage (40–70 % of U_s)
Built-in signal relays for Run (PSR3 ... 45) and TOR (PSR25 ... 45)

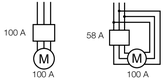
PSS

LED indications:
Power supply ON
Completed start ramp TOP OF RAMP
EXTERNAL FAULT
GENERAL FAULT (motor side or unit)
Built-in signal relays for fault and by-pass
Transparent lid to protect the settings
Three rotating switches setting:
-Start ramp (1–30 sec)
-Stop ramp (0–30 sec)
-Initial voltage (30–70 % of U_s)
-Current limit 1.5 –4 x I_e (If used: Initial voltage fixed at 40 % of U_s)
Dip-switch for In Line/ Inside Delta connection

PST/PSTB

In-Line or Inside Delta for PSS and PST(B)

Softstarters type **PSS18/30...300/515** and **PST30 ... 300, PSTB370...1050** can be connected inside the motor delta (compare the connection for standard Wye-Delta starters). In this case the current through the softstarter is reduced by 42 %. It will then be possible, for example, to run a 100 A motor using a 58 A PSS/PST Softstarter.



Integrated advanced motor protection

Inside the PST Softstarter, you will find useful features for advanced motor and softstarter protection, including; programmable overload protection, high current, underload, phase imbalance, phase reversal, thyristor overload protection, and bypass monitoring to ensure proper by-pass operation.

Programmable signal relays

All PST units have three programmable signal relays where each relay can signal Run, Top of Ramp or Event. The Event setting can be used to signal protections, faults and warnings. The supervisory functions monitor not only software and critical softstarter functionality but also phase loss and out of frequency range.

Integrated By-pass contactor

On the larger sizes (PSTB 370 ... PSTB1050), there is an ABB AF contactor integrated. This gives you advantages in terms of cost saving, space saving and last but not least energy saving. With a by-pass contactor you can reduce the power losses during normal run by 90 % or more.
The smaller units, PST30 up to PST300, which are not equipped with a built-in by-pass contactor, have an extra set of three terminals on the line side. The terminals are marked B1, B2 and B3 and shall be used when connecting an external by-pass contactor. This will enable the integrated protection functions also when the softstarter is by-passed.

External keypad (option)

An external keypad is available as an option. The keypad can be mounted on a panel door for example to view/control the softstarter without opening the door. The keypad can also be used to copy parameters between different softstarters.

Fieldbus communication

The PST Softstarter has a built-in interface on the front for connection of the ABB FieldBusPlug used for fieldbus communication. Through this interface it is possible to control the softstarter, achieve status information, up- and down load of parameters.
The interface between the softstarter and the FieldBusPlug is always the same. Independently of PST Softstarter size or delivery date it is possible to connect to any fieldbus protocol later on since this is defined in the FieldBusPlug itself. Available protocols are AS-Interface, DeviceNet, Profibus DP and Modbus-RTU. To connect the PST Softstarter to a fieldbus system you need the appropriate accessories as well as specific software for PLC set-up, which is available at www.abb-control.com on the Softstarter pages.

Torque control

The default setting is a normal voltage ramp but it is possible to select torque ramp. With the torque control function it is possible to start and stop motors with a more linear acceleration than when using the normal voltage ramps.
During start this can be used to reduce the wear on the equipment driven by the motor.

During stop, controlling the torque is especially useful for pump applications where voltage ramps can lead to a sudden torque drop which may result in water hammering and pressure surges. Torque control will keep these problems to an absolute minimum.

Torque limit

With the torque limit function enabled, the torque can never exceed a set value during start. This will minimize stress and wear on the equipment driven by the motor.

Analog output

With the PST(B) softstarter it is possible to have analog output signals to be used as input to a PLC or an analog meter. The output signals can be selected to be for instance the current of the motor, main voltage, active power or the temperature of the motor. The terminals used for analog output are also used for PTC protection, so only one of these functions can be used.

The complete range

ABB offers three softstarter ranges

The compact range, PSR3...45 covers motor currents from ***3 to 45 A***.

- The compact design **makes its possible to fit more products on a given mounting surface**.
- **Easy to install**. Can either be snapped onto a DIN rail or screw mounted.
- Clear setting instructions are provided on the front.

The flexible range, PSS18...300 which is intended for motor currents from ***18 A - 250 A "Inline" and up to 515 A "Inside Delta" configuration***, offers a solution possible to adapt to almost any application:

- With two connection possibilities, either **in line with the motor or inside the motor delta.**
- Can be equipped with **current limit**. (possibility to limit the current during start)
- **Easy to set up.** With just three clearly labeled rotary switches on the front of the unit it is possible to adjust the softstarter for a wide range of applications.
- **Solid state electrical circuit** ensures the highest reliability and reduces the need for maintenance to a minimum, even in applications with frequent starts and stops.

The advanced range, PST(B)30...1050
Besides many functions this range also speaks your language. The range covers motor currents from ***30 A to 1062 A "Inline" and up to 1810 A "Inside Delta" configuration***.

- **Advanced integrated protection**
- **Flexible bus communication system**.
- **LCD display**. With 13 languages, a menu system similar to your mobile phone, preprogrammed application settings and automatic status and event logging, it couldn't be easier to set up and operate!
- **Programmable signal relays**.
- **Integrated by-pass contactor on PSTB**.
- **Torque control**.
- **Analog output**.

The compact range, PSR3 ... 45	The flexible range, PSS18/30 ... 300/515	The advanced range, PST30 ... PSTB1050	
O	–	•	Field bus communication enabled
–	–	•	Real time clock
–	–	•	Programmable fault supervision functions
–	–	•	Programmable warning functions
–	–	•	PTC input for motor protection
–	–	•	High current protection
–	–	•	Phase imbalance /phase reversal protection
–	–	•	Locked rotor protection
–	•	•	Thyristor overtemperature protection
–	–	•	Motor overload protection
–	–	•	Four button keypad (external keypad available)
–	–	O	External keypad
–	O	•	Current limit control
–	•	•	In Line and Inside Delta connection
–	•	•	LED indications
•	–	•	Built-in by-pass contactor (On PSTB)
•	•	•	Ramp Start/Stop
–	–	•	Torque control
–	–	•	Analog output

- • Standard
- O Optional
- - Not available

Benefits with ABB's Softstarters
+ Soft start/Soft stop
+ Torque control
+ Current limit/Torque limit
+ No current peaks
+ No torque peaks
+ Less mechanical wear
+ Less maintenance
+ No production breaks
Result = **PROFIT**

Publication LV351
No. 1SXU 132 061 B0203
Printed in USA, January 2006

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Panorama

Softstarters

The Complete Range

Softstarters for every customer need...

Why soft start?

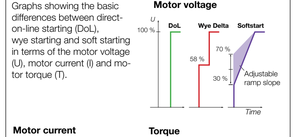
Do you have rough and jerky motor starts? High starting currents and torques? Or high current and torque peaks?

When it is important to have smooth start-up you can use a softstarter. Instead of switching directly to full voltage the softstarter ensures gradual voltage increase during start-up which naturally limits the current.

ABB offers the most complete range of softstarters on the market. You can find all product-related documentation such as brochures, catalogs, certificates and drawings at: www.abb.com/lowvoltage

Differences between different starting methods

Graphs showing the basic differences between direct-on-line starting (DoL), wye starting and soft starting in terms of the motor voltage (U), motor current (I) and motor torque (T).



Take the stress out of starting – use a Softstarter from ABB

Quick guide for selection

Normal start Class 10
Select size according to the motor HP ratings

Typical applications
- Bow thruster
- Compressor
- Elevator
- Centrifugal pump
- Conveyor belt (short)
- Escalator

Heavy duty start Class 30
Select one size larger than the motor HP ratings

Typical applications
- Centrifugal fan
- Crusher
- Mixer
- Conveyor belt (long)
- Mill
- Stirrer

! If more than 10 starts /h
Select **one** size larger than the standard selection.